

REMARKS

Claims 1 to 20 are pending. By this Amendment, claims 6 and 9 are amended.
No new matter is added.

The Office Action rejects claims 6 and 9 under 35 U.S.C. §112, second paragraph, as being indefinite. Applicants have amended claims 6 and 9 as suggested by the Examiner. Thus, reconsideration and withdrawal of the rejection of claims 6 and 9 under 35 U.S.C. §112, second paragraph, are respectfully requested.

The Office Action rejects claims 1-20 under 35 U.S.C. §103(a) as being unpatentable over Kruecke *et al.* (U.S. Pat. No. 6,080,799) in view of Moore *et al.* (U.S. Pat. No. 5,658,962). This rejection is traversed.

The technical problem addressed by the presently claimed invention was to have available mixtures comprising HFC 365mfc, to be utilized in substitution of HFC 141b, to obtain polymeric foams having improved properties in regard to maintenance in time of the thermoinsulating properties, in particular thermal conductivity (see page 4, lines 17-22 of the present specification).

In fact, although it had been known to use HFC 365mfc as a drop-in substitute of HFC 141b, the polymeric foams obtained by using HFC 365mfc as a foaming agent had the drawback that their thermoinsulating properties are not satisfactory, in particular for their maintenance over time (see page 4, lines 9-15 of the present specification).

Therefore, there was a need to improve the thermoinsulating properties over time of the foams obtained with HFC 365mfc.

The technical problem has been solved according to claim 1 of the present application by utilizing a mixture of HFC 365mfc and the hydrofluoroethers of formula (I), with boiling points comprised in the range from 50°C to 150°C.

Table II on page 24 of the present specification illustrates the influence on the thermal conductivity of foams stored at 23°C and 50% relative moisture for a period of 35 days. It is noted that, after 24 hours, thermal conductivities of the foams according to the presently claimed invention are lower than that of the foam of comparative example 1, where HFC 365mfc alone was used. The same result was maintained at the end of the storage period of 35 days.

Table II shows that the difference between the thermal conductivity of the foam of comparative example 1 and the foams of examples 2-6 at the beginning of the experiment was at least of 0.4 mW/m.[°]K (example 3). At the end of the experiment, the difference amounted to at least 0.6 mW/m.[°]K (examples 3 and 6).

Applicants again note that the hydrofluoroethers of the present invention, when utilized in admixture with HFC 365mfc to form polymeric foams, do not behave as blowing agents and therefore do not foam the polymer. This is demonstrated in the following parts of the specification:

- Examples 2-6 show that addition of the hydrofluoroethers to HFC 365mfc does not modify the cell size in comparison to the polyurethane foam obtained by utilizing HFC 365mfc alone (example 1). This means that the hydrofluoroethers are neither foaming agents nor cell size modifiers. See page 13, lines 12-19 of the present specification.

- Comparative example 7 on page 19 of the present specification describes an experiment in which it is demonstrated that by utilizing the same conditions used to obtain foams with HFC 365mfc, the hydrofluoroethers of formula (I) alone do not foam the polymers.

The Office Action asserts that “Kruecke differs from applicants’ claims in that hydrofluoroalkyl ethers and/or other hydrofluoro-compounds as claimed...are not particularly required” (page 3, fourth paragraph of the Office Action).

Applicants note that Kruecke et al. disclose, in column 1, lines 54-60, mixtures consisting of:

- HFC 365mfc; and
- at least one fluorinated hydrocarbon having two or three carbon atoms, having formulas according to column 1, lines 57-60.

Kruecke et al. make available a method to manufacture polymeric foams with simpler processing and to provide blowing agent mixtures that do not have a flash point (see column 1, lines 45-49). The mixtures are liquid at atmospheric pressure and 20°C, and can be used in this form if they are to be incorporated into plastics that are to be foamed. Therefore, the thermoplastic materials can be extruded directly into foamed panels, sheets or profiles, and the plastic composition foams directly upon leaving the nozzle (column 2, lines 28-38).

Kruecke et al. also state that further blowing gases can optionally be added to the compositions (see column 3, line 54).

Applicants note that Kruecke et al. nowhere mentions the technical problem of improving the thermoinsulating properties of polymeric foams obtained with HFC

365mfc. Therefore, one of skill in the art would not have found in Kruecke et al. any teaching, suggestion or motivation toward the solution found in the presently claimed invention.

The statement of column 3, line 54, of Kruecke et al., on which it appears the obviousness rejection is based, does not provide any indication whatsoever on the chemical nature of the further blowing gases that can optionally be added to the compositions of Kruecke et al.

In any case, one of skill in the art reviewing the above referred column and line of Kruecke et al., and searching for further blowing agent gases to be used in admixture with HFC 365mfc, would have been led away from the presently claimed invention. In fact, the hydrofluoroethers as defined in present claim 1, when employed in mixtures with HFC 365mfc, are not blowing agents, as herein above explained.

The Office Action asserts that "Moore discloses these compounds (Applicants remark the hydrofluoroethers of claim 1) having boiling points, structures and molecular weights as claimed,... to be useful in polymeric foams preparations for the purpose of imparting acceptable foaming effects" (page 3 of the office action, fourth full paragraph).

Moore et al. has already been discussed in Applicants' previous Amendment. Applicants remark again that Moore et al. discloses hydrofluoroethers having a very wide range of boiling points, from 45°C (example 16 in column 20) to 195°C (example 10 in column 18).

In Moore et al., there is no teaching or suggestion to any combination of the hydrofluoroethers of Moore et al. with HFC 365mfc, since Moore et al. does not

disclose or suggest any mixture of the hydrofluoroethers with HFC blowing agents.

Furthermore, Moore et al. nowhere teaches or suggests that by making such a combination, the thermoinsulating properties of the obtained foams would improve in comparison to those of foams obtained by using HFC 365mfc alone.

The Office Action further asserts that "It would have been obvious for one of ordinary skill in the art to have employed the blowing agents of Moore et al. in the preparations of Kruecke et al. for the purpose of imparting their acceptable blowing and cell regulating effect in order to arrive at the products and/or processes of applicants' claims" (last paragraph of page 3 of the Office Action).

Since Moore et al. discloses, as discussed above, hydrofluoroethers having a very wide range of boiling points, in the combination proposed by the Office Action, there is not any hint to select the hydrofluoroethers as defined in present claim 1 from Moore et al., and use them in Kruecke et al.

On this issue, Applicants note that comparative example 9 on page 20 of the present specification shows that, by using a mixture of HFC 365mfc with a hydrofluoroether having a boiling point of 178°C, i.e., within the teachings of Moore et al., the obtained foam does not solve the technical problem solved by the presently claimed invention. See, in particular, the paragraph bridging pages 20-21 of the present specification.

Further, Kruecke et al. states that further blowing gases may be optionally added. Therefore, one of skill in the art would have looked for blowing agent compounds, not for hydrofluoroethers that do not show blowing agent properties when used together with HFC 365mfc.

In sum, the above grounds of rejection for obviousness have no proper basis, since one of ordinary skill in the art, in order to arrive at the solution found in the presently claimed invention, would have had to choose an optional compound for the composition of Kruecke et al. which does not have the property indicated for the compound: i.e. it should not be a blowing agent.

The technical problem addressed by the presently claimed invention was instead, as discussed above, to obtain foams of HFC 365mfc showing an improved maintenance over time of foam properties, as opposed to foams wherein HFC 365mfc alone was used.

In the combination asserted in the Office Action, there is not any hint toward the solution found in the presently claimed invention.

Applicants respectfully submit that the combination asserted in the Office Action results, at best, from an *ex post facto* analysis, i.e. requiring the knowledge of the solution indicated in the present specification.

Thus, for at least the above reasons, reconsideration and withdrawal of the rejection of claims 1-20 under 35 U.S.C. §103(a) are respectfully requested.

The Office Action also rejects claims 1-3, 5-18 and 20 under 35 U.S.C. §103(a) as being unpatentable over Kruecke *et al.* in view of Klug *et al.* (U.S. Pat. No. 5,605,882). This rejection is traversed.

Applicants note that the Office Action, in the third full paragraph on page 5, makes the following assertions regarding the combination of Kruecke et al. and Klug et al.:

- That Klug et al. discloses the hydrofluoro compounds claimed by Applicants, having the boiling points as claimed;
- That it would have been obvious for one of ordinary skill in the art to have employed the blowing agents of Klug et al. in the preparation of Kruecke et al. for the purpose of imparting their acceptable blowing and cell regulating effect in order to arrive at the products and/or processes of Applicants' claims.

However, Applicants note that the hydrofluoroethers disclosed in Klug et al. and used in admixture with hydrofluorocarbons are listed in columns 3-4 of Klug et al. and are numbered from 1-19. The one having the highest boiling point is the hydrofluoroether number 19 (column 4: $\text{CHF}_2\text{OCH}_2\text{CF}_3$) having a boiling point of 29°C.

Therefore, the assertion in the Office Action that Klug et al. discloses the hydrofluoro compounds claimed by Applicants, having the boiling points as claimed, is not correct, since none of the hydrofluoroethers disclosed by Klug et al. has a boiling point of 50°C or above.

Therefore, Applicants respectfully submit that the asserted combination of Klug et al. with Kruecke et al. would not have led one of skill in the art to the composition of present claim 1. Thus, it is respectfully submitted that the presently claimed invention would not have been obvious over the asserted combination.

For at least the above reasons, reconsideration and withdrawal of the rejection of claims 1-3, 5-18 and 20 under 35 U.S.C. §103(a) are respectfully requested.


In view of the amendments and remarks above, Applicants respectfully submit that this application is in condition for allowance and request favorable action thereon. Should the Examiner believe anything further is desirable in order to place this

application in even better condition for allowance, the Examiner is invited to contact Applicants' representatives at the telephone number listed below.

In the event this paper is not considered to be timely filed, Applicants respectfully petition for an appropriate extension of time. The Commissioner is authorized to charge payment for any additional fees that may be required with respect to this paper or credit any overpayment to Counsel's Deposit Account 01-2300, making reference to Attorney No. 108910-00121.

Respectfully submitted,

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